

Figure 3 is a flow chart diagram illustrating one embodiment of a speculative data mirroring method 300 of the present invention. The depicted embodiment of the speculative data mirroring method 300 includes an initiate synchronous operation step 310, a send associated data step 320, an insert into rollback log step 330, an error received test 340, an initiate rollback operations step 350, and an end step 360. The speculative data mirroring ~~method 600~~ method 300 is conducted from the perspective of a source storage controller, such as the source storage controller 210a of Figure 2.

**Amendments to Claims**

Please amend the claims as follows:

1. (Currently Amended) An apparatus for speculative data mirroring, the apparatus comprising:  
a rollback log configured to receive write data, the write data corresponding to at least one write operation to a storage region within a source volume;  
a mirror control module configured to initiate a ~~synchronized~~synchronous operation on a corresponding storage region within a target volume; and  
the mirror control module further configured to send the write data corresponding to the at least one write operation to the target volume without waiting for feedback regarding the ~~lock-synchronous~~ operation on the target volume, wherein the synchronous operation must complete prior to writing the write data to the target volume.
2. (Original) The apparatus of claim 1, further comprising a source storage controller operably connected to the source volume and a target storage controller operably connected to the target volume.
3. (Original) The apparatus of claim 2, further comprising a transmission link operably connecting the source storage controller to the target storage controller.
4. (Currently Amended) The apparatus of claim 1, wherein the ~~synchronized~~ synchronous operation comprises a lock operation comprising a lock command, and the mirror control module is further configured to send a the lock command to the a target volume storage controller operably connected to the target volume.

5. (Original) The apparatus of claim 4, wherein the mirror control module is further configured to insert the lock command and the data corresponding to the at least one write operation into the rollback log.
6. (Currently Amended) The apparatus of claim 4, wherein the mirror control module is further configured to send the lock command and the at least one write operation to the target storage controller and the target storage controller is further configured to repetitively attempt to execute the lock command until the target storage region is locked and to write the data to the target storage region in response to obtaining the lock on the target storage region.
7. (Original) The apparatus of claim 5, wherein the mirror control module is further configured to remove the lock command from the rollback log in response to successful execution of the lock operation on the target volume.
8. (Original) The apparatus of claim 1, wherein the mirror control module is further configured to remove the data corresponding to the at least one write operation from the rollback log in response to successfully writing the data to the target volume.
9. (Currently Amended) The apparatus of claim 1, wherein the mirror control module is further configured to halt transmission of the data corresponding to the at least one write operation in response to a rejection of the ~~lock~~ synchronous operation.
10. (Currently Amended) The apparatus of claim 9, wherein the mirror control module is further configured to resume transmission of the data corresponding to the at least one write operation in response to subsequent execution of the ~~lock~~ synchronous operation.

11. (Currently Amended) The apparatus of claim 1, wherein the mirror control module is further configured to initiate retransmission of the data corresponding to the at least one write operation in response to a rejection of the ~~lock~~ synchronous operation.
12. (Currently Amended) An apparatus for bidirectional speculative data mirroring, the apparatus comprising:
- a first storage control module configured to conduct synchronous storage operations including lock operations on a first storage volume;
  - a second storage control module configured to conduct synchronous storage operations including lock operations on a second storage volume;
  - a first mirror control module configured to initiate a lock operation on a storage region within the second storage volume, the first mirror control module further configured to send data corresponding to at least one write operation to the first storage volume without waiting for feedback regarding the lock operation on the second storage volume; and
  - a second mirror control module configured to initiate a lock operation on a storage region within the first storage volume, the second mirror control module further configured to send data corresponding to at least one write operation to the second storage volume without waiting for feedback regarding the lock operation on the first storage volume.

13. (Original) The apparatus of claim 12, wherein the synchronous storage operations comprise a lock operation, and further comprising a first rollback log configured to receive data corresponding to the at least one write operation to the first storage volume and a second rollback log configured to receive data corresponding to the at least one write operation to the second storage volume.
14. (Currently Amended) A method for speculative data mirroring, the method comprising:  
inserting data into a rollback log, the data corresponding to a write operation to a storage region within a source volume;  
initiating a ~~synchronous~~ synchronous operation on a corresponding storage region within a target volume; and  
sending the data corresponding to the write operation to the target volume without waiting for feedback regarding the ~~lock-synchronous~~ synchronous operation.
15. (Original) The method of claim 14, wherein initiating a synchronous operation comprises sending a lock command to the target volume.
16. (Original) The method of claim 14, further comprising removing the data corresponding to the write operation from the rollback log in response to successful execution of the write operation on the target volume.
17. (Original) The method of claim 14, wherein inserting data into the rollback log further comprises inserting a lock command into the rollback log.

18. (Original) The method of claim 17, further comprising removing the lock command from the rollback log in response to successful execution of the lock command on the target volume.
19. (Currently Amended) The method of claim 14, further comprising halting transmission of the data corresponding to the write operation in response to rejection of the ~~lock-synchronous~~ operation.
20. (Original) The method of claim 19, further comprising resuming transmission of the data stored in the rollback log in response to successful execution of the lock operation.
21. (Currently Amended) An apparatus for speculative data mirroring, the apparatus comprising:  
receiving means configured to receive data corresponding to a write operation to a storage region within a source volume;  
initiating means configured to initiate a synchronous operation on a corresponding storage region within a target volume; and  
messaging means configured to send the data corresponding to the write operation to the target volume without waiting for feedback regarding the ~~lock-synchronous~~ operation.
22. (Original) A system for speculative data mirroring, the system comprising:  
a source storage controller operably connected to a source volume;  
a target storage controller operably connected to a target volume;  
a rollback log configured to receive data corresponding to a write operation to a storage region within the source volume;

a storage control module operably connected to the target storage controller, the storage control module configured to initiate a synchronous operation on a corresponding storage region within the target volume.

23. (Original) The system of claim 22, where the synchronous operation comprises a lock operation, and further comprising a mirror control module operably connected to the source storage controller, the mirror control module configured to send the data corresponding to the write operation to the target volume prior to receiving acknowledgement of the lock operation.

24. (Currently Amended) A computer readable storage medium comprising computer readable program code for conducting a method of speculative data mirroring, method comprising:  
receiving into a rollback log data corresponding to a write operation, the write operation directed to a storage region within a source volume;  
initiating a synchronous operation on a corresponding storage region within a target volume; and  
sending the data corresponding to the write operation to the target volume prior to receiving acknowledgement of the ~~lock~~ synchronous operation.

25. (Original) The computer readable storage medium of claim 24, wherein initiating a synchronous operation comprises sending a lock command to the target volume.

26. (Original) The computer readable storage medium of claim 24, wherein the method further comprises removing the data corresponding to the write operation from the rollback log in response to successful execution of the write operation on the target volume.
27. (Original) The computer readable storage medium of claim 24, wherein inserting data into the rollback log further comprises inserting a lock command into the rollback log.
28. (Original) The computer readable storage medium of claim 27, the method further comprising removing the lock command from the rollback log in response to successful execution of the lock command on the target volume.
29. (Original) The computer readable storage medium of claim 24, the method further comprising halting transmission of the data corresponding to the write operation in response to rejection of the lock operation.
30. (Original) The computer readable storage medium of claim 29, the method further comprising resuming transmission of the data stored in the rollback log in response to successful execution of the lock operation.